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Evaluation Report No.E1078E

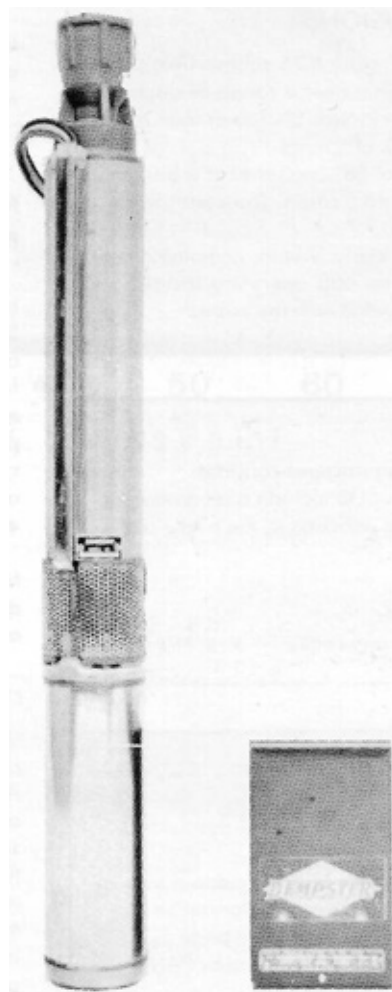
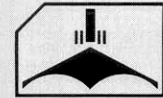
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Evaluation Report



Report On

DEMPSTER M75 SUBMERSIBLE DEEP WELL PUMP - 129

prairie agricultural machinery institute

Humboldt, Saskatchewan · Lethbridge, Alberta · Portage la Prairie, Manitoba

DIRECTOR

..... J.A. Peck

DEMPSTER M75 SUBMERSIBLE DEEP WELL PUMP

MANUFACTURER:

Dempster Industries Inc.
Beatrice, Nebraska 68310
U.S.A.

DISTRIBUTOR:

McPherson and Thom (Alberta) Limited
428 Moraine Road North East
Calgary, Alberta
T2A 2P2

RETAIL PRICE:

\$492.00 (f.o.b. Winnipeg, Manitoba, October, 1978,
complete with termination kit).

SUMMARY AND CONCLUSIONS

Measured capacity of the Dempster M75 submersible pump varied from 80.0 L/min to 10 L/min over a range of discharge heads from 9.0 to 87.0 m. Capacity was 8% lower than manufacturer's published data at peak efficiency.

Peak pump-motor efficiency of 28% occurred at a discharge head of 128 m with a flow of 48.5 L/min. The corresponding power output was 0.51 kW.

The operator's manual was clearly written, containing comprehensive installation, servicing and operating instructions. An electrical wiring kit was provided with the pump.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

Modifying the operator's manual to include a recommendation that a suitable safety line be attached to the pump during installation.

Chief Engineer - E. O. Nyborg

Senior Engineer - J. C. Thauberger

Project Engineer - R. R. Hochstein

THE MANUFACTURER STATES THAT:

With regard to the recommendation:

To further clarify the need to attach a safety cable during installation, we intend to modify the Owner's Manual so that a more specific statement is also incorporated, on page 5, under the heading Pump Installation, as recommended by PAMI.

GENERAL DESCRIPTION

The Dempster M75 is a 100 mm diameter, 13 stage, deep well, submersible water pump with a 32 mm (nominal 1-1/4 inch NPT) discharge outlet, designed for use in wells up to 90 m deep. It is powered by a 230 V, 0.56 kW Franklin electric motor. The manufacturer recommends that, during well development, pump capacity be regulated to one-third of maximum flow.

Detailed specifications are given in APPENDIX I.

SCOPE OF TEST

The performance characteristics of the Dempster M75 were determined with water, over a full range of discharge heads, using a standard pump testing procedure¹. In addition, operator's manual suitability and pump safety aspects were assessed.

RESULTS AND DISCUSSION

PERFORMANCE CHARACTERISTICS

Pump performance characteristics, over a range of discharge heads from 9 to 92 m of water are given in FIGURE 1. Maximum flow rate of 9 m discharge head was 80 L/min while flow ceased at a discharge head of 92 m. The manufacturer's published performance data indicated higher pumping rates than those obtained, over the full range of discharge heads. At the point of peak pump-motor efficiency the manufacturer's published data exceeded the PAMI test data by 8%. The peak efficiency, occurring at a head of 63 m, was 28%. The corresponding flow rate was 48.5 L/min.

Maximum power output was 0.51 kW, occurring at the peak efficiency point, with a corresponding current draw of 7.85A. A reduction in line voltage from 230 volts to 204 volts did not have any appreciable effect on the overall performance.

OPERATORS MANUAL

The operator's manual was clearly written and contained comprehensive installation, servicing and operating instructions. Although one 9 mm diameter eye was provided on the pump for attachment of a safety line, installation instructions did not suggest use of a line when installing the pump. It is suggested that the operator's manual be expanded to include recommendations on the use of a suitable safety line. Plastic pipe can be easily damaged, during installation, or due to unexpected pumping pressure. When installing the pump with galvanized pipe, security would also be assured during coupling of successive pipe lengths.

SAFETY ASSESSMENT

Three methods of splicing the motor drop cable were clearly explained in the operator's manual. All methods provided safe electrical connections if the instructions were closely followed.

The operator's manual did not recommend a minimum pressure rating for the discharge line but did advise that a suitable pressure relief valve be used in the discharge line.

1. PAMI T7821, Detailed Test Procedures for Domestic Water Pumps.

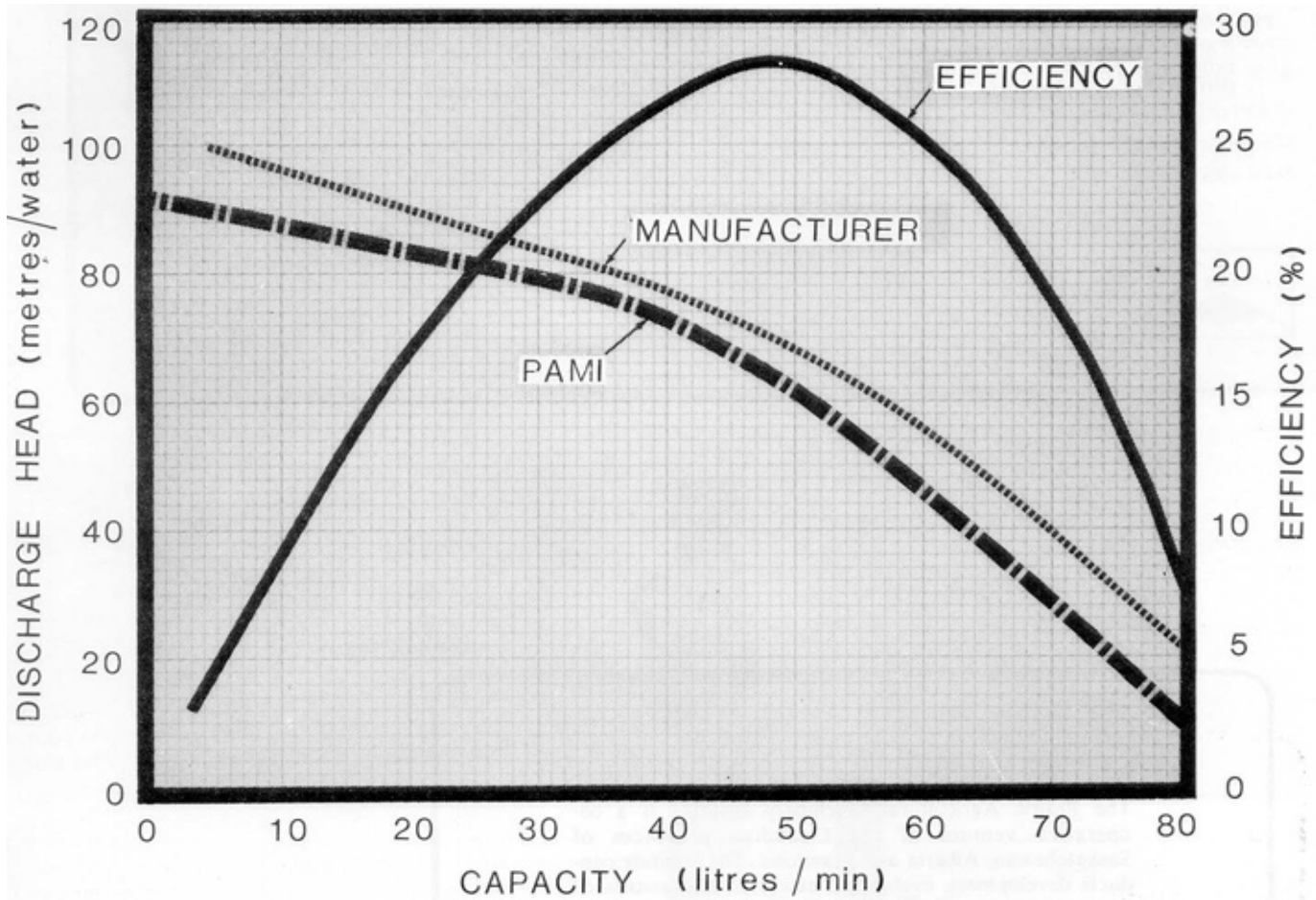


FIGURE 1. Performance Characteristics.

APPENDIX I

SPECIFICATIONS:

Pump:

make Dempster
 model M75
 serial number 7984
 number of impellers 13
 speed 3450 rpm

Motor:

make Franklin Electric
 model 2143074116 Date Code L76
 size 0.56 kW (0.75 hp)
 voltage 230V
 ampere rating 6.4A
 service factor amperage 7.7A
 service factor 1.5
 speed 3450 rpm

Overall Dimensions:

motor length 260 mm (10.3 in)
 pump length 350 mm (13.75 in)
 total length 846 mm (33.3 in)
 clearance diameter 97 mm (3.83 in)

Total Weight:

19.5 kg (43 lb)

location 406 mm (16 in) above pump foot
 screen type stainless steel
 screen mesh 3.2 mm (0.125 in)
 inlet area 19870 mm² (30.8 in²)

Outlet:

nominal size 32 mm (1-1/4 in NPT)

Rope Eyes:

number 1
 diameter 9 mm (0.36 in)

APPENDIX II

METRIC UNITS:

In keeping with the Canadian metric conversion program, this report has been prepared in SI Units. For comparative purposes, the following conversions may be used:

1 metre (m) = 1000 millimetres (mm) = 39.7 inches (in)
 1 kilopascal (kPa) = 0.102 metres water = 0.145 pounds/square inch (psi)
 1 litre/min (L/min) = 0.22 Imperial gallon/minute (gal/min)
 1 kilowatt (kW) = 1.34 horsepower (hp)



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